

# A REVISION OF THE GENUS *CANAEA* WALKER (LEPIDOPTERA, THYRIDIDAE)

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## SYNOPSIS

The genus *Canaea* Walker was removed from synonymy with *Rhodoneura* Guenée by Whalley (1964). In the present paper the genus is redefined, ten species are placed in the genus, including five new species and seven new subspecies which are described here. A key to the species and a map of the distribution of this Oriental-Australasian genus are given.

## INTRODUCTION

THE genus *Canaea* was erected by Walker for one species, *C. semitessellata*. This species was subsequently transferred to *Rhodoneura* Guenée by Hampson (1897) but the generic name *Canaea* was used by Gaede (1917) for another species (*Canaea janenschi*, transferred to *Hypolamprus* Hampson, Whalley, in press). *Canaea* was removed from synonymy with *Rhodoneura* Guenée by Whalley (1964).

In the present work the genus is redefined and separated into two species-groups, both of Oriental-Australasian distribution. Both species-groups contain similarly patterned species, differing primarily in the structure of the male antennae, and forming a parallel series in their distribution. Within each species-group the differences between species is mainly in the male genitalia, with much smaller differences in the female, but fewer female specimens were available for examination.

The whole genus is very homogeneous and closely allied to *Neobanisia* Whalley from the Ethiopian Region. The main difference between this genus and *Canaea* is in the presence of the secondary sac on the bursa of the females in *Canaea*, which is absent in *Neobanisia*. There are other differences in the males but the basic morphology of these two genera is very similar. The genus *Canaea* is characterized, in the females, by strongly sclerotized and spiny plates round the ostium. The anal papillae and the sclerites of the last abdominal segment are similarly spined and sclerotized. At the edge of the ostium in some species, two leaf-like spiny and sclerotized processes are present.

*Canaea* is separated into the two species-groups on the basis of the length of antennal pectinations in the male. In the *hyalospila*-group, the antennae in the male have long pectinations; in the *plagiata*-group, the males have minutely ciliate antennae. Few female specimens of *Canaea* were available for examination and no key is given for this sex. Modifications of structures, here called *socii*, occur in a number of species. These structures, while covered with modified scales, are often fused or partly fused to the wall of the anal tube (sometimes resembling a scaphium and subscaphium) where they appear to afford some support for it. It is not certain if these sclerotized plates are strictly homologous with *socii*.

All the wing measurements given in the descriptions are taken from the apex of the fore wing to the centre of the mesothorax.

#### ACKNOWLEDGEMENTS

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All the specimens are in the British Museum (Natural History) unless otherwise indicated.

#### CHECK-LIST OF THE SPECIES OF *CANAEA* WALKER

##### THE *HYALOSPILA*-GROUP (pectinate antennae in male)

- C. semitessellata* Walker
- C. similella* sp. n.
- C. complicata* sp. n.
- C. mercurata* sp. n.
- C. ignotalis* (Röber)
- C. brandti* sp. n.
- C. rusticata rusticata* subsp. n.
- C. rusticata aversata* subsp. n.
- C. rusticata pallidata* subsp. n.
- C. hyalospila hyalospila* (Lower)
- C. hyalospila fusca* subsp. n.
- C. hyalospila monstrosa* subsp. n.

##### THE *PLAGIATA*-GROUP (simple, minutely ciliate antennae in male)

- C. semitessellalis* (Walker)
- C. plagiata plagiata* (Warren)
- C. plagiata albicollaris* (Warren)
- C. plagiata neoalbicollaris* subsp. n.
- C. plagiata propinqua* subsp. n.

*CANAEA* Walker, 1863

*Canaea* Walker, 1863: 73. Type-species: *Canaea semitessellata* Walker, by monotypy.

*Canaea* Walker; Hampson, 1897: 615.

*Canaea* Walker; Warren, 1905: 410.

*Canaea* Walker; Dalle Torre, 1914: 17.

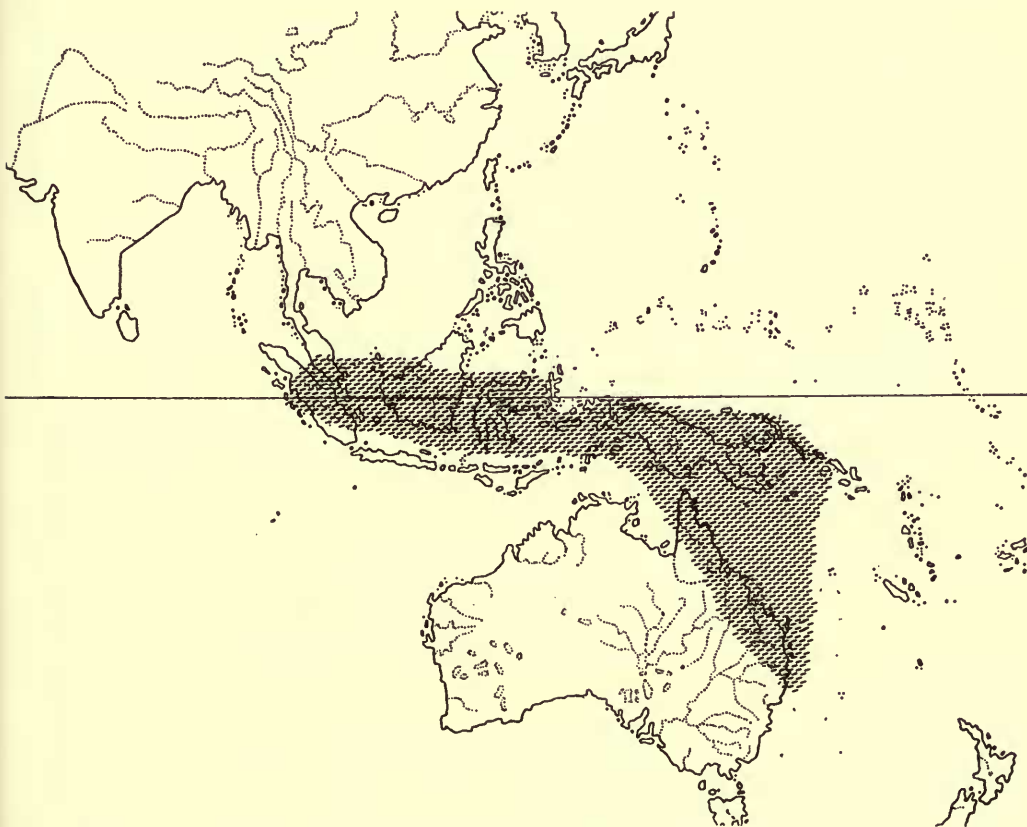
*Canaea* Walker; Gaede, 1917: 369.

*Canaea* Walker; Gaede, 1929: 495.

*Canaea* Walker; Whalley, 1964: 118.

*Canaea* Walker; Whalley, *Bull. Brit. Mus. nat. Hist. (Ent.)* Suppl. 1971: 17, in press.

GENERIC DESCRIPTION. Ocelli absent. Antennae simple or pectinate. Chaetosema absent. Labial palps three-segmented. Eyes without interfacetal hairs. Fore tibia with epiphysis. Hind tibia with two pairs of spurs. Hind tarsi each with pair of apical spines. Fore wing with  $R_2$  to  $R_5$  generally from cell, some radial veins running very close together. Hind wing with  $Sc + R_1$  and  $R_s$  approaching closely but not joining. Male genitalia with some modifications of socii. Uncus frequently modified. Base of sacculus usually with elongate process, juxta small membranous. Large sclerotized process near base of costa of valve. Female with ostium and anal papillae strongly spined and sclerotized. Secondary sac on bursa.



Distribution of species of genus *Canaea* Walker

**DISTRIBUTION.** The world distribution of species of the genus is shown in Map 1. A single female specimen from the Philippines, tentatively identified as *C. ignotalis* Röber, is not included in the distribution shown in Map 1. Further material of this is needed to confirm this identification. In *C. hyalospila* there are two subspecies on the Australian continent and one in New Guinea. One of the Australian subspecies is more closely allied to the New Guinea subspecies than it is to the other Australian subspecies. With the limited series available in the *hyalospila*-group, the differences in external pattern and genitalia have been used to indicate specific rather than sub-specific differences, even though the species in the group form geographically isolated groups from Malaya to Australia.

**BIOLOGY.** No information.

#### KEY TO THE MALES OF *CANAEA* Walker

- |       |  |                                 |
|-------|--|---------------------------------|
| 1     | Antennae pectinate ( <i>hyalospila</i> -group) . . . . .   | 3                               |
| —     | Antennae not pectinate ( <i>plagiata</i> -group) . . . . .   | 2                               |
| 2 (1) | Patagia white. Sacculus process short . . . . .  | <i>plagiata</i> (p. 175)        |
| —     | Patagia grey-brown. Sacculus process long and slender . . . . .  | <i>semitessellalis</i> (p. 174) |
| 3 (1) | Strongly spined pad in centre of gnathus . . . . .   | <i>hyalospila</i> (p. 172)      |
| —     | No spiny pad in centre of gnathus . . . . .  | 4                               |
| 4 (3) | Prominent process on either side of base of uncus. Valve process relatively simple (Pl. 6, fig. 32) . . . . .  | <i>similella</i> (p. 165)       |
| —     | No basal process on uncus. Valve process usually more spinose . . . . .  | 5                               |
| 5 (4) | Apex of uncus rounded, no process . . . . .  | 6                               |
| —     | Apex of uncus variously shaped, with process . . . . .   | 8                               |
| 6 (5) | Sacculus process reduced to rounded lobes (Pl. 6, fig. 36) . . . . .   | <i>brandti</i> (p. 168)         |
| —     | Sacculus process prominent . . . . .   | 7                               |
| 7 (6) | Sacculus process long and slender, reaching half distance to costa of valve. Basal process on valve slender, sclerotized, with spines (Pl. 6, fig. 35) . . . . . | <i>ignotalis</i> (p. 167)       |
| —     | Sacculus process short, not reaching half distance to costa of valve. Basal process on valve a slender, sclerotized spine . . . . .                              | <i>mercurata</i> (p. 167)       |
| 8 (5) | Sacculus process reduced to small spine . . . . .  | <i>complicata</i> (p. 166)      |
| —     | Sacculus process long . . . . .  | 9                               |
| 9 (8) | Sacculus process long, slightly toothed at apex. Uncus slender (Pl. 6, fig. 31) . . . . .  | <i>semitessellata</i> (p. 164)  |
| —     | Sacculus process shorter, apex of process usually without teeth. Uncus broad (Pl. 7, fig. 37) . . . . .  | <i>rusticata</i> (p. 169)       |

#### DESCRIPTIONS OF THE SPECIES

##### THE *HYALOSPILA*-GROUP

##### *Canaea semitessellata* Walker

(Pl. 1, fig. 1; Pl. 6, fig. 31; Pl. 12, figs 68, 69)

*Canaea semitessellata* Walker, 1864: 73.

*Rhodoneura semitessellata* (Walker) Hampson, 1897: 619.

[*Rhodoneura semitessellalis* sensu Hampson, 1897: 619, nec Walker, misidentification.]

[*Siculodes ignotalis* sensu Hampson, 1897: 619, nec Röber, misidentification.]

*Canaea semitessellata* Walker; Warren, 1905: 410.

*Canaea semitessellata* Walker; Dalle Torre, 1914: 33.

*Canaea semitessellata* Walker; Gaede, 1917: 369.

*Rhodoneura semitessellata* (Walker); Gaede, 1932: 755.

[*Rhodoneura semitessellalis* sensu Gaede, 1932: 755, nec Walker, misidentification.]

[*Rhodoneura ignotalis* sensu Gaede, 1932: 755, nec Röber, misidentification.]

[*Rhodoneura hyalospila* sensu Gaede, 1932: 755, nec Lower, misidentification.]

[*Rhodoneura tessellatula* sensu Gaede, 1932: 755, nec Pagenstecher, misidentification.]

*Canaea semitessellata* Walker; Whalley, 1964: 118.

♂. Wing, 16.5–18.5 mm. Vertex brown, irrorate with white. Antennae strongly monopectinate. Labial palps upturned, not reaching vertex, third segment  $\frac{1}{2}$  length of second segment. Frons rounded. Tegulae long. Thorax brown. Hind tibia with outer spur of distal pair  $\frac{1}{2}$  length of inner spur. Frenulum single. Fore wing, pattern as in Pl. 1, fig. 1, brown with white areas. Veins  $R_3$ ,  $R_4$  and  $R_5$  arise close together from cell but not anastomosing. Underside, as upperside, paler. Hind wing, as fore wing.

GENITALIA ♂ (Pl. 6, fig. 31). Uncus long, narrow, dorso-ventrally Y-shaped at end. Socii with large sclerotised processes on each side of anal tube. Gnathus arms thickened, just meeting in mid-line. Sacculus produced into long arms on each side of juxta, apex of arms toothed. Valve narrowing in apical third. Large, sclerotized, leaf-like, toothed process on valve at base near costa. Saccus small. Aedeagus without spines in vesica. Ductus seminalis arising one third of way along aedeagus.

♀. Wing, 21 mm. Colour and pattern as male. Frenulum triple.

GENITALIA ♀ (Pl. 12, figs 68, 69). Anal papillae short, sclerotized. Ostium sclerotized and very spiny. Ostial plate roughly rectangular. Duct convolute. Small patches of sclerotized plates forming signum.

DISCUSSION. Few specimens of this species are known. The dorso-ventral Y-shape of the apex of the uncus and the leaf-like sclerotized processes on the valves are characteristic. The gnathus is less heavily sclerotized than in some of the other species in the genus. The single male from Malaya has a more slender process on the valve and shorter arms to the base of the sacculus but is otherwise similar to the Borneo specimen. The only female specimen is similarly coloured to the male, and in this *semitessellata* differs from most other species in the genus, where there is sexual dimorphism in colour. The size of the signum is not clear in the single female specimen examined but is probably less than one third of the size of the whole bursa sac. The sclerotized ostium is similar in shape to *C. ignotalis* Röber. Although the type-specimen of *Rhodoneura tessellatula* Pagenstecher has not been traced, the species is here removed from synonymy with *semitessellata* because this species and the genus are not at present known from the Philippines, the type-locality of *tessulatula*.

DISTRIBUTION. Malaysia: Sarawak, Malaya.

#### MATERIAL EXAMINED

Holotype ♀. SARAWAK: genitalia slide 430-1964, (B.M. slide no. 9555), in University Museum, Oxford.

SARAWAK: 1 ♂ (*Moore*); 1 ♀ (*Wallace*), abdomen missing; MALAYA: 1 ♂, Perak, Gunong Kledang, xi.1916.

#### *Canaea similella* sp. n.

(Pl. 1, fig. 2; Pl. 6, fig. 32)

♂. Wing, 15.5–17 mm. Vertex white with brown-tipped scales. Antennae strongly monopectinate. Labial palps with third segment almost  $\frac{1}{2}$  length of second segment. Frons rounded, not projecting between eyes. Thorax pale brown, tegulae long. Hind tibia with outer

spur of distal pair less than  $\frac{1}{2}$  length of inner spur. Large scale tuft on tibia. Fore wing, pattern as in Pl. 1, fig. 2, brown with lighter areas. Veins  $R_2$ ,  $R_3$  and  $R_4$  run close together but do not anastomose. Underside, as upper side, paler. Hind wing, pattern and colour as fore wing.

GENITALIA ♂ (Pl. 6, fig. 32). Uncus long, laterally expanded at tip and with lateral processes at base. Socii strap-like. Gnathus lightly sclerotized, just meeting in mid-line. Valve pointed, strap-like sclerotized process at base. Juxta small, lightly sclerotized. Base of sacculus with two short processes, toothed at apex. Saccus small. Aedeagus without spines in vesica, ductus seminalis arising one third along aedeagus.

♀. Unknown.

DISCUSSION. The shape of the uncus and the strap-like, non-serrate, process on the valve are characteristic. This species is related to *semitessellata* where the modifications of the uncus are less extreme. The uncus of *semitessellata* has a long stem to the 'Y'-shape, *similella* has a short stem to the 'Y' with broadly expanded (dorso-ventrally) arms. The pale areas of the wing are generally smaller than in *semitessellata*. Although this species is only known from two specimens, they are sufficiently distinct to be regarded as good species and not as subspecies of *semitessellata*.

DISTRIBUTION. Indonesia: Sumatra.

#### MATERIAL EXAMINED

Holotype ♂. INDONESIA: Sumatra, Medan, ii, Doloc Baros Estate, Sumatra (coll. Le Moul't), B.M. slide no. 10876, in BMNH.

Paratype. INDONESIA: Sumatra, 1♂, data as holotype.

### *Canaea complicata* sp. n.

(Pl. 1, figs 3, 4; Pl. 6, fig. 33)

♂. Wing, 16-17 mm. Vertex brown, irrorate with white. Antennae strongly monopectinate. Labial palps with third segment  $\frac{1}{2}$  length of second, small scale tuft between eyes. Thorax brown, irrorate with white. Tegulae long, reaching 1st abdominal segment. Hind tibia with outer spur of distal pair  $\frac{1}{2}$  length of inner spur. Fore wing, pattern as in Pl. 1, fig. 3, brown with circular white areas. Frenulum single. Veins  $R_1$ ,  $R_2$  and  $R_3$  close together and veins  $R_4$  and  $R_5$  close together but none anastomosing. Underside, as upper, paler. Hind wing, colour and pattern as fore wing.

GENITALIA ♂ (Pl. 6, fig. 33). Uncus long and slender, enlarged at apex. Socii large. Gnathus weakly sclerotized, not meeting at mid-line. Valve pointed. Sacculus enlarged, with small process on each side of juxta. Saccus small. Large, sclerotized, spiny process on costa at base of valve. Aedeagus with two minute sclerotized plates in vesica but no spines.

♀. Unknown.

DISCUSSION. This species can be separated from *similella* by the lack of the basal processes on the uncus and on the shape of the basal process on the valve. Little variation exists in the series examined. The apex of the uncus is expanded as in *C. similella*. *C. complicata* is fairly widespread in Papua and New Guinea, where all the existing specimens were captured at altitudes of over 4000 feet.

DISTRIBUTION: Papua; New Guinea.

#### MATERIAL EXAMINED

Holotype ♂. PAPUA: Mafulu, 4000 ft, xii.1933 (*Cheesman*), B.M. slide no. 10812, in BMNH.

Paratypes. PAPUA: 2 ♂, data as type; 2 ♂, Mafulu, 4000 ft, i.1934 (*Cheesman*); 1 ♂, Mondo, 5000 ft, ii-iii.1934 (*Cheesman*); 3 ♂, Biagi, Mambare R., 5000 ft, iii.1906 (*Meek*); 1 ♂, Angabunga R., affl. St Joseph, 6000 ft, xi.1905 (*Meek*). NEW GUINEA: 4 ♂, Tapini, Loloipa River, 6200 ft, 25.ii-2.v.1958 (*Brandt*), in C.S.I.R.O., Canberra; 1 ♂, Finisterre Range, Kiambarvi, 4500 ft (*Brandt*), 22.vii-28.viii.1958, in C.S.I.R.O., Canberra; 7 ♂, Aiyura, E. Hlds, 27.ix.1957, 6000 ft, (*Munroe & Holland*), in Canadian National Collection, Ottawa.

***Canaea mercurata* sp. n.**

(Pl. 1, fig. 5; Pl. 6, fig. 34)

♂. Wing, 15.5-17 mm. Vertex white, irrorate with brown. Antennae strongly monopectinate. Labial palps with third segment  $\frac{1}{2}$  length of second. Thorax reddish brown, irrorate with white. Tegulae reaching 1st abdominal segment. Hind tibia with outer spur of distal pair less than  $\frac{1}{2}$  length of inner spur. Fore wing, pattern as in Pl. 1, fig. 5, brown with yellowish white areas. Frenulum single. Veins  $R_1$ ,  $R_2$  and  $R_3$  run close together but do not anastomose. Underside, as upperside, paler. Hind wing, colour and pattern as fore wing.

GENITALIA ♂ (Pl. 6, fig. 34). Uncus clavate. Socii lightly sclerotized, broad. Gnathus lightly sclerotized, small projection in mid-line. Valves narrow at apex. Small, double, sclerotized process and raised setose papilla near base of valve. Juxta small, membranous. Base of sacculus upturned into pointed process on each side of juxta. Saccus small. Vesica of aedeagus without spines.

♀. Unknown.

DISCUSSION. This species can be separated from the others in the genus by the short, clavate, uncus, relatively small valve process and lightly sclerotized gnathus. The flattened basal elongations of the sacculus are also characteristic. Externally the pattern is very similar to *C. complicata*. At present *C. mercurata* is known only from a short series collected at the same time on the island of Buru. It is possible that with more specimens examined, this species may prove to be a subspecies of *C. ignotalis* Röber, but the male genitalia are quite distinct. *C. ignotalis* also occurs on Buru.

DISTRIBUTION. Indonesia: Buru.

**MATERIAL EXAMINED**

Holotype ♂. INDONESIA: Buru, Kako Tagalago, Central Buru, 2700 feet, v.1922 (*Pratt*), B.M. slide no. 10873, in BMNH.

Paratypes. INDONESIA: 3 ♂, data as holotype.

***Canaea ignotalis* (Röber) comb. n.**

(Pl. 2, figs 7, 8; Pl. 6, fig. 35; Pl. 9, figs 50, 52, 54)

*Siculodes*(?) *ignotalis* Röber, 1891: 329.

*Siculodes ignotalis* Röber; Röber, 1892, pl. 6, fig. 7.

[*Rhodoneura ignotalis* sensu Hampson, 1897: 618, nec Röber, misidentification.]

[*Rhodoneura ignotalis* sensu Gaede, 1932: 755, nec Röber, misidentification.]

♂. Wing, 15-20 mm. Vertex white, irrorate with brown. Antennae strongly monopectinate. Labial palps with third segment  $\frac{1}{2}$  length of second, upturned, just reaching vertex. Prothorax white, irrorate with brown. Hind tibia with outer spur of distal pair less than

$\frac{1}{2}$  length of inner spur. Fore wing, pattern as in Pl. 2, fig. 7, pale grey-brown with white areas. Veins  $R_2$ ,  $R_3$  and  $R_4$  run close together. Underside as upper, paler. Hind wing, colour and pattern as fore wing.

GENITALIA ♂ (Pl. 6, fig. 35). Uncus partially hidden by socii and anal tube. Gnathus weakly sclerotized, just meeting in mid-line. Valve pointed. Sacculus enlarged and produced on either side of juxta into a prominent toothed and sclerotized process. Aedeagus with row of small sclerotized plates in vesica.

♀. Wing, 22 mm. Antennae minutely ciliate. Labial palps with third segment more than  $\frac{1}{2}$  length of second, long, protruding well in front of head. Frenulum double. Pattern as male but darker coloured.

GENITALIA ♀ (Pl. 9, figs 50, 52, 54). Anal papillae short, heavily sclerotized. Ostium strongly sclerotized, spiny. Duct strongly convolute, broad. Bursa with large oval signum, with rows of sclerotized plates. Rest of bursa covered with minute, lightly sclerotized plates.

DISCUSSION. *C. ignotalis* has not yet been found in New Guinea but a closely allied species occurs in the Bismarck Archipelago. Generally the males of *ignotalis* are paler in colour than any other species in the genus but there is some variation within the *ignotalis* series. *C. ignotalis* can be distinguished from the other species in the genus by the shape of the uncus, the very elongate processes of the sacculus on each side of the juxta and the shape of the sclerotized process of the valve. From *C. brandti* it can be separated by the shape of the base of the sacculus; this is very elongate in *ignotalis* but short in *brandti*, and by the presence of cornuti in the aedeagus of *ignotalis* which are absent in *brandti*. The single female from the Philippines is generally similar to the female *ignotalis*, but smaller with small differences in the genitalia.

DISTRIBUTION. Indonesia: Sulawesi [Celebes], Salajar, Buru.

#### MATERIAL EXAMINED

Holotype ♂. INDONESIA: Sulawesi, Bonerate. This specimen has not been traced and is probably lost. However the original illustrations leave no doubt as to the identity of the species and therefore no neotype is designated.

INDONESIA: 1 ♂, Buru, Kako Tagalago, 2700 ft, 1922 (*Pratt*); 2 ♂, Sulawesi, Pangean, near Maros, 2000 ft, iii.1938 (*Kalis*); 7 ♂, 4 ♀, Loda, Paloe, 4000 ft, v.1937 (*Kalis*); 3 ♂, 1 ♀, Tjamba, near Maros, 1500 ft, ii.1938 (*Kalis*); 1 ♂, 1 ♀, Sidaonta, Paloe, 4500 ft, vi.1937 (*Kalis*); 3 ♂, Lindoe, Paloe, 3700 ft, iv.1937 (*Kalis*); 1 ♂, 3 ♀, Koelawi, Paloe, 3100 ft, iii.1937 (*Kalis*); 2 ♂, Salajar [Selayar], Somarisi, 1660 ft, xii.1938 (*Kalis*). [1 ♀, PHILIPPINES: Mindanao (*Moinsay*)].

#### *Canaea brandti* sp. n.

(Pl. 1, fig. 6; Pl. 5, fig. 30; Pl. 6, fig. 36)

♂. Wing, 18.5–20.5 mm. Vertex pale brown, irrorate with white. Antennae strongly monopectinate (Pl. 5, fig. 30). Labial palps upturned, third segment  $\frac{1}{2}$  length of second segment. Patagia coloured as vertex. Thorax brown, irrorate with white. Tegulae reaching to 1st abdominal segment. Hind tibia with outer spur of distal pair  $\frac{1}{2}$  length of inner spur. Scale tuft on tibia. Fore wing, pattern as in Pl. 1, fig. 6, brown with white areas. Reddish brown in median fascia. Underside, as upperside, paler. Veins  $R_2$ ,  $R_3$ , and  $R_4$  run very close together but do not anastomose. Frenulum single. Hind wing, colour and pattern as fore wing.

GENITALIA ♂ (Pl. 6, fig. 36). Uncus elongate, slightly clavate. Socii long and lightly sclerotized. Gnathus arms lightly sclerotized, just meeting in mid line. Valve pointed.

Basal sclerotization near costa with one long and several short processes. Sacculus enlarged basally, part of sacculus raised on either side of juxta as minutely toothed process. Saccus small. Aedeagus without strong sclerotization in vesica.

♀. Unknown.

DISCUSSION. This species is closely allied to *ignotalis*, from which it can be separated by less sharply clavate uncus, shape of basal process and the very short process of the sacculus, contrasting with the very elongate ones in *ignotalis*. The aedeagus of *brandti* also lacks the sclerotized plates of *ignotalis*. Until the female of *brandti* is known there is an element of doubt in its exact status. The male genitalia are very different from *ignotalis* but this may, in view of the geographic isolation of this species from *ignotalis*, be of subspecific value only. At present neither species is known from the main island of New Guinea.

DISTRIBUTION. Bismarck Archipelago; New Britain; New Ireland.

#### MATERIAL EXAMINED

Holotype ♂. NEW BRITAIN: Mt Sinewit, 3500 ft, 27.vi-17.ix.1963 (*Brandt*), B.M. slide no. 10860, in C.S.I.R.O., Canberra.

Paratypes: NEW BRITAIN: 5 ♂, data as holotype, in C.S.I.R.O.; NEW IRELAND: 1 ♂, Schleinitz Mts, Lelet Plateau, 3000 ft, 2.x-15.xii.1959, in C.S.I.R.O., Canberra.

### *Canaea rusticata* sp. n.

This species is separated into three geographically isolated subspecies which differ slightly in genitalia structure and, in one subspecies, in the length of the antennal pectinations in the male. *C. rusticata* is distributed throughout New Guinea and the Solomon Islands and can be separated from the other species in the genus by the presence of a ventral process at the apex of the uncus and the shape of the gnathus of the male. *C. rusticata* is related to *semitessellata* Walker from Sarawak but can be separated from that species by the shape of the uncus and the valve processes.

#### KEY TO THE SUBSPECIES OF *C. rusticata* sp. n.

- |       |   |           |                              |
|-------|---|-----------|------------------------------|
| 1     | Antennal pectinations as in Pl. 5, fig. 27            | . . . . . | 2                            |
| -     | Antennal pectinations as in Pl. 5, fig. 28            | . . . . . | <i>r. aversata</i> (p. 170)  |
| 2 (1) | Pale brown wings. Uncus with long ventral process     | . . . . . | <i>r. pallidata</i> (p. 171) |
| -     | Reddish brown wings. Uncus with short ventral process | . . . . . | <i>r. rusticata</i> (p. 169) |

### *Canaea rusticata rusticata* subsp. n.

(Pl. 2, figs 9, 10; Pl. 5, figs 27, 29; Pl. 7, fig. 37; Pl. 9, figs 51, 55)

♂. Wing 18-21 mm. Vertex brown irrorate with white. Antennae strongly monopectinate (Pl. 5, figs 27, 29). Labial palps with third segment  $\frac{1}{4}$  length of second segment. Frons rounded between eyes. Patagia light brown irrorate with white. Tegulae and thorax rufous brown. Hind tibia with outer spur of distal pair  $\frac{1}{3}$  length of inner spur. Long scent scales on hind tibia. Fore wing, pattern as in Pl. 2, fig. 9, reddish brown with white areas. Frenulum single. Veins  $R_2$ ,  $R_3$ , and  $R_4$  run close together but do not anastomose. Hind wing, pattern as fore wing. Underside as upper but paler.

GENITALIA ♂ (Pl. 7, fig. 37). Uncus short with ventral projection. Socii long, sclerotized

Gnathus arms with slightly serrate edge, heavily sclerotized, broad, just meeting in mid-line. Valve pointed. Base of sacculus enlarged into curved process on each side of juxta. Large sclerotized process on valve with many small sclerotized plates in vesica.

♀. Wing, 18–22 mm. Pattern similar to male (Pl. 2, fig. 10) but rounded areas of wing orange-brown, not white, and brown colour generally darker than in male. Antennae minutely ciliate. Labial palps with third segment  $\frac{1}{2}$  length of second segment, upturned, reaching vertex. Frenulum triple.

GENITALIA ♀ (Pl. 9, figs 51, 55). Anal papillae and ostium strongly sclerotized. Ostium expanded on either side into two spiny plates. Duct convolute. Bursa covered with lightly sclerotized ribbing, no distinct signum.

DISCUSSION. This subspecies is separated from the others by the shorter and more truncated ventral process at the apex of the uncus. The differences in antennae are shown in Pl. 5, figs 27, 28. There are differences in the shape of the process of the valve near the costa between all three subspecies. The females are less distinct but *C. rusticata rusticata* tends to be more reddish brown than the other subspecies. *C. rusticata rusticata* has similar antennal pectinations in the male to *C. rusticata pallidata* from the Solomon Islands but the shape of the apex of the uncus of these subspecies differs.

DISTRIBUTION. Papua.

#### MATERIAL EXAMINED

Holotype ♂. PAPUA: Kumusi River, low elev., vi.1907 (*Meek*), B.M. slide no. 10845, in BMNH.

Paratypes. PAPUA: 4 ♂, 4 ♀, data as holotype; 1 ♂, Milne Bay, ii.1899 (*Meek*); 1 ♂, Upper Aroa River, ii.1903 (*Meek*); 1 ♂, Peria Creek, Kwagira River, 50 m, 14.viii.1953, in U.S. National Museum.

#### *Canaea rusticata aversata* subsp. n.

(Pl. 2, figs 11, 12; Pl. 5, fig. 28; Pl. 7, figs 38, 39; Pl. 10, figs 56, 60)

♂. Wing, 18.5–23 mm. Colour and pattern as nominate subspecies. Antennal pectination (Pl. 5, fig. 28), shorter and more truncate than in *C. rusticata rusticata*, otherwise morphologically as nominate subspecies.

GENITALIA ♂ (Pl. 7, figs 38, 39). Uncus with prominent ventral projection. Gnathus broad, strongly sclerotized with toothed edge. Base of sacculus sclerotized and produced into long process on each side of juxta. Sclerotized process on valve with small spines at apex and along process. Aedeagus as nominate subspecies.

♀. Wing, 21–22 mm. Pattern as male but circular areas more yellow-brown.

GENITALIA ♀ (Pl. 10, figs 56, 60). As nominate subspecies, lateral plates of ostium slightly more slender than in nominate subspecies.

DISCUSSION. This subspecies can be separated from the nominate one by the shape and length of the antennal pectinations and in the male genitalia by the relative lengths of the process of the sacculus, the shape of the uncus and the more extensive spines on the sclerotized valve process. The females are less distinct, *C. r. aversata* tend to have more yellow on the wings than the nominate subspecies but few females were available for comparison. This subspecies occurs mostly in the eastern part of New Guinea. The single specimen from the Torricelli Mts differs

slightly from the other specimens of this subspecies in the shape of the sclerotized process on the valve but the rest of its genitalia are similar.

DISTRIBUTION: Indonesia: West Irian; New Guinea.

#### MATERIAL EXAMINED

Holotype ♂. INDONESIA: West Irian, Fak-Fak, 1700 ft, i-ii.[19]08 (*Pratt*), B.M. slide no. 10839, in BMNH.

Paratypes. INDONESIA: West Irian, 1 ♂, Nomnagihe, 25 ml., S. Wanagaar, 2000 ft, i-ii.1921 (*Pratt*); 3 ♂, Mt Kunupi, Menoo Valley, Wayland Mts, 6000 ft, xi-xii.1920 (*Pratt*); 3 ♂, 1 ♀, Fak-Fak, 1700 ft (*Pratt*); 3 ♂, Ninay Valley, Centr. Arfak Mts, 3500 ft, xi.1908; 1 ♂, Humboldt Bay Distr., 31.vii.1937 (*Strüber*); 1 ♂, Humboldt Bay Distr., Wembi, 30.vii.1937 (*Strüber*); 2 ♂, Cyclops Mts, Sabron, 2000 ft, vi.1936 (*Cheesman*); 3 ♂, Waigeu, Camp Nok, 2000 ft, v.1938, at light (*Cheesman*).

Material not included in type-series. NEW GUINEA: 2 ♂, Torricelli Mts, Mokai, 2500 ft, 8.xii.1958-23.i.1959, in C.S.I.R.O., Canberra; 4 ♂, Bainyik, Sepik Distr., 1000 ft, 28.xi.1957 (*Munroe & Holland*), in Canadian National Collection, Ottawa; 1 ♂, NE. Wau, 1150 m, 13.viii.1968 (*Szent-Ivany*); 1 ♂, NE. Wau, 1150 m, 3.xii.1968 (*Szent-Ivany*); 1 ♂, NE. Wau, 1150 m, 25.x.1968 (*Szent-Ivany*); 1 ♂, NE. Wau, 1150 m, 29.ii.1968 (*Szent-Ivany*); 2 ♀, NE. Wau, 1150 m, 2.xii.1968 (*Szent-Ivany*); 1 ♀, NE. Wau, 1150 m, 11.xii.1968 (*Szent-Ivany*); 1 ♀, NE. Garaina, 800 m, x.1968 (*Szent-Ivany*); 1 ♀, NE. Garaina, 800 m, xi.1968 (*Szent-Ivany*), in Bishop Museum, Hawaii; 1 ♂, Jini River, Western Highlands, 4600 ft, 16.vii-21.ix.1961 (*Brandt*), in C.S.I.R.O., Canberra; 1 ♂, Kiungu, Fly River, 2.vii.-31.x.1957 (*Brandt*) in C.S.I.R.O., Canberra; 1 ♀, Torricelli Mts, Mobitei, 8.xii.1959 (*Brandt*), in C.S.I.R.O., Canberra.

#### *Canaea rusticata pallidata* subsp. n.

(Pl. 3, fig. 13; Pl. 7, figs 40, 41; Pl. 10, figs 57, 61)

♂. Wing, 20-21 mm. Paler colour than nominate subspecies, otherwise similar. Antennal pectinations as in nominate subspecies.

GENITALIA ♂ (Pl. 7, figs 40, 41). Uncus produced at apex into long ventral process. Gnathus with smooth edge. Prominent bifid process on valve near costa with large teeth. Sacculus strongly sclerotized and curved processes.

♀. Wing, 20 mm. Pattern as female of nominate subspecies. Colour as male, but with more reddish brown in hind wings.

GENITALIA ♀ (Pl. 10, figs 57, 61). Sclerotized spiny projections on either side of ostium smaller than in nominate subspecies.

DISCUSSION. The sexual dimorphism of colour shown by the other two subspecies is not as clear in *C. r. pallidata*, which is a much paler colour. In the male genitalia, the length of the ventral process at the apex of the uncus, the shape of the sclerotized process on the valve and the size and shape of the process on the sacculus separate this subspecies from the others.

DISTRIBUTION. Solomon Islands.

#### MATERIAL EXAMINED

Holotype ♂. SOLOMON ISLANDS: Vella Lavella, iii.1908 (*Meek*), B.M. slide no.

10190, in BMNH.

Paratypes. SOLOMON IS: 1 ♂, data as type; 1 ♂, 1 ♀, Bougainville, iv.1904 (*Meek*).

***Canaea hyalospila* (Lower) comb. n.**

*Striglina hyalospila* Lower, 1894: 87.

*Striglina hyalospila* Lower; Hampson, 1897: 613.

[*Rhodoneura semitessellata* sensu Dalle Torre, 1914: 33, nec Lower, misidentification.]

[*Rhodoneura semitessellata* sensu Gaede, 1932: 755, nec Lower, misidentification.]

*C. hyalospila* can be separated from all others in the genus by the large spiny pad at the apex of the gnathus in the male. There are three subspecies of which *C. h. fusca* from New Guinea is darker and slightly larger than the other two. The antennae in the male are strongly pectinate. The two Australian subspecies, *h. hyalospila* and *h. monsfera* are from different parts of the Cape York peninsula. *C. h. monsfera* has more characters in common with the New Guinea subspecies than with the other Australian one.

KEY TO THE SUBSPECIES OF *C. hyalospila* (Lower)

- |       |   |                                  |
|-------|---|----------------------------------|
| 1     | Wing 18 mm–21 mm. Dark reddish brown, genitalia as in Pl. 8, fig. 43  | <i>hyalospila fusca</i> (p. 174) |
| –     | Wing 16 mm–19 mm. Brown or reddish brown species. Genitalia with uncus and basal costal process differing from Pl. 8, fig. 43 | 2                                |
| 2 (1) | Genitalia as in Pl. 7, fig. 42  | <i>h. hyalospila</i> (p. 172)    |
| –     | Genitalia as in Pl. 8, fig. 44  | <i>h. monsfera</i> (p. 173)      |

***Canaea hyalospila hyalospila* (Lower)**

(Pl. 3, figs 14, 15; Pl. 7, fig. 42; Pl. 10, figs 58, 59)

*Striglina hyalospila* Lower, 1894: 87.

♂. Wing, 16.5–19 mm. Vertex whitish brown, frons rounded. Ocelli absent. Antennae strongly pectinate. Labial palps with third segment  $\frac{1}{4}$  length of second. Hind tibia with outer spur of distal pair less than half length of inner spur. Spurs with sclerotized tips. Pronotum grey-brown. Thorax reddish brown, tegulae long, reaching to 1st abdominal segment. Fore wing, pattern as in Pl. 3, fig. 14, reddish brown with circular white areas. Frenulum single. Veins  $R_2$ ,  $R_3$  and  $R_4$  close together but not anastomosing. Hind wing, colour and pattern as fore wing.  $Sc + R_1$  and  $Rs$  approach closely but do not join.

GENITALIA ♂ (Pl. 7, fig. 42). Uncus simple. Gnathus arms strongly sclerotized, joined in mid-line to form spiny pad. Valves pointed. Strongly sclerotized basal costal process with small spines near base. Base of sacculus enlarged, ending in long slender process, slightly toothed at apex. Saccus small. Aedeagus with sclerotized manica and small plate-like cornuti.

♀. Wing, 17.5–19.5 mm. Pattern as male but darker orange-brown. Labial palps with third segment  $\frac{1}{4}$  length of second. Frenulum triple.

GENITALIA ♀ (Pl. 10, figs 58, 59). Anal papillae short, sclerotized. Ostium heavily sclerotized with two lateral, spiny, sclerotized lobes. Duct convolute. Bursa without signum. Secondary sac arising near opening of duct to bursa.

DISCUSSION. This subspecies can be separated from the others by the lack of the ventral process at the apex of the uncus of the male, the shape of the juxta,

basal costal processes and by the more flattened spiny pad at the apex to the gnathus. At present it is known only from Queensland, where specimens are variable in size and pattern. Warren (1898: 223) mentions the holotype specimen as being in the Rothschild collection.

DISTRIBUTION: Australia.

#### MATERIAL EXAMINED

Holotype ♀. AUSTRALIA: St Barnard's Island, [18]91 (*Barnard*), in BMNH, specimen lacks abdomen.

AUSTRALIA: 2 ♂, Queensland, Kuranda (*Dodd*); 2 ♂, Queensland; 1 ♂, Queensland, Mackay; 1 ♂, Queensland, 1 ml. east of Kuranda, 3.v.1955 (*Common*); 1 ♀, Queensland, Kuranda (*Dodd*), 1912; 1 ♀, Queensland, Lockerbie, Cape York, 31.iii.1964 (*Common & Upton*); 1 ♂, Queensland, Mt Lewis, 8 ml. NW Mt Molloy, 2700 ft, 15.iii.1964 (*Common & Upton*); 1 ♂, Queensland, Mt Edith, 18 ml. NE Atherton, 15.iii.1964 (*Common & Upton*), in C.S.I.R.O., Canberra; 1 ♂, Queensland, Kuranda, 4-5.i.[19]29 (*Otter*); 1 ♂ (no date), in South Australian Museum; 2 ♀, Queensland, 3 ml. W. of Mossman, 13-14.iii.1964 (*Common & Upton*), in C.S.I.R.O., Canberra.

### *Canaea hyalospila monsfera* subsp. n.

(Pl. 3, fig. 17; Pl. 8, fig. 44)

♂. Wing, 17-18 mm. Colour and pattern as nominate subspecies but separated by the shape of parts of the male genitalia. Fore wing, pattern as in Pl. 3, fig. 17.

GENITALIA ♂ (Pl. 8, fig. 44). Uncus with rounded ventral projection at apex. Gnathus arms broad, strongly sclerotized, broad median spiny pad. Sclerotized costal process with small spines near apex of process, basal spine reduced. Saccus process on each side of juxta, long, pointed, with minute spines along length. Aedeagus as in nominate subspecies.

♀. Wing, 16-19 mm. Pattern as in male but darker orange-brown, otherwise as nominate subspecies.

GENITALIA ♀. As nominate subspecies.

DISCUSSION. Externally this species is indistinguishable from the nominate one in either sex but in the male genitalia the shape of the uncus, juxta, and gnathus separate them from one another. The status of this and the nominate subspecies need further study. *C. h. monsfera* is closer in the morphology of the genitalia to *C. h. fusca* from New Guinea and might be considered a subspecies of the New Guinea one if *fusca* was elevated to specific rank. However the females of all the subspecies of *hyalospila* are virtually indistinguishable, although the specimens from New Guinea are generally larger and darker than the others.

DISTRIBUTION: Australia.

#### MATERIAL EXAMINED

Holotype ♂. AUSTRALIA: Queensland, Iron Range, 12.iv.1964 (*Common & Upton*), B.M. slide no. 10878, in C.S.I.R.O., Canberra.

Paratypes. AUSTRALIA: 1 ♂, data as holotype; 2 ♀, Queensland, Iron Range, 9-15.iv.1964 (*Common & Upton*), in C.S.I.R.O., Canberra.

*Canaea hyalospila fusca* subsp. n.

(Pl. 3, fig. 16; Pl. 8, fig. 43; Pl. 12, figs 70, 71)

♂. Wing, 18–21 mm. Much darker reddish brown than nominate subspecies and usually larger.

GENITALIA ♂ (Pl. 8, fig. 43). Uncus with rounded ventral process at tip. Gnathus sclerotized with spiny median pad more pointed than in nominate subspecies. Sclerotized basal costal process with small spines. Spine at base of process prominent. Sacculus process on either side of juxta long, slightly spiny. Aedeagus differs from nominate subspecies in having smaller sclerotized plates in vesica.

♀. Wing 20.5 mm. As male but more orange in circular areas in wing.

GENITALIA ♀ (Pl. 12, figs 70, 71). As nominate subspecies.

DISCUSSION. This subspecies is larger and much darker in colour than the other two. Most of the other differences are in the male genitalia. From *C. h. monsfera*, which this subspecies most closely resembles in the structure of the male genitalia, it can be separated by the shape of the sclerotized basal process on the valve and the more pointed spiny median pad on the gnathus. There is variation in colour and some variation in the male genitalia in specimens from different localities in New Guinea. The significance of this is not yet apparent with the few specimens studied.

DISTRIBUTION. Indonesia: West Irian; Papua.

## MATERIAL EXAMINED

Holotype ♂. INDONESIA: West Irian, Mt Goliath, 5000 ft, 13° long., ii.1911 (Meek), B.M. slide no. 10843, in BMNH.

Paratypes. INDONESIA: 5 ♂, 1 ♀, data as holotype; 5 ♂, West Irian, nr Oetakwa R., Snow Mts, 3500 ft (Meek); PAPUA: 5 ♂, Babooni, 3600 ft, ix.1903 (Pratt); 2 ♂, Ekeikei, 1500 ft, i–ii.1903 (Pratt); 6 ♂, 1 ♀, Mt Kebea, 3600 ft, iii–iv.1903 (Pratt).

THE *PLAGIATA*-GROUP*Canaea semitessellalis* (Walker) comb. n.

(Pl. 4, figs 19, 20; Pl. 8, fig. 45; Pl. 9, figs 49, 53)

*Pyrallis*(?) *semitessellalis* Walker, 1865: 1246.

*Striglina semitessellalis* (Walker) Pagenstecher, 1892: 445.

[*Rhodoneura semitessellalis* sensu Hampson, 1897: 618, nec Walker, misidentification.]

[*Rhodoneura semitessellalis* sensu Dalle Torre, 1914: 33, nec Walker, misidentification.]

[*Rhodoneura semitessellalis* sensu Gaede, 1932: 755, nec Walker, misidentification.]

♂. Wing, 13.5–17 mm. Vertex grey-brown. Antennae minutely ciliate. Labial palps with third segment  $\frac{1}{2}$  length of second. Frons rounded, not projecting between eyes. Patagia and tegulae pale grey-brown. Thorax pale grey-brown. Hind tibia with outer spur of distal pair  $\frac{1}{2}$  length of inner spur. Fore wing, pattern as in Pl. 4, fig. 19, grey-brown with yellow-brown areas. Translucent circular patch in median area. Underside, similar, paler. Darker patches of scales in median and basal areas. Veins  $R_2$  to  $R_5$  from cell. Hind wing, pattern similar to fore wing, slightly more orange-red around reticulations. Single black spot in basal area.

GENITALIA ♂ (Pl. 8, fig. 45). Uncus clavate. Gnathus and socii fused to form sclerotized ring round anal tube. Valve slender, small sclerotized, hooked, basal process. Juxta membranous. Sacculus on each side of juxta terminating in long slender process, one process longer than the other. Saccus small. Aedeagus with spiny manica and sclerotized cornutus.

♀. Wing, 16–18 mm. Pattern as male, more orange-brown colour. Labial palps with third segment  $\frac{1}{2}$  length of second. Venation as male.

GENITALIA ♀ (Pl. 9, figs 49, 53). Anal papillae short. Ostium sclerotized. Projection from end of first part of duct of bursa sclerotized, convolute part then leading to bursa. Bursa with two spiny patches, joined by smaller spines.

DISCUSSION. This species is variable in pattern and intensity of colour. Two specimens from Mt Tamborine (Queensland) (Pl. 4, fig. 20) are much darker and have a more reduced pattern than the majority of specimens examined. The genitalia of these specimens are indistinguishable from the holotype. A single female specimen from Kiungu, Fly River, New Guinea, had a similar signum to *semitessellalis* but there are differences in the shape of the ostium, the size of the signum and the pattern of the wings. The New Guinea specimen probably represents a new subspecies or possibly even a distinct species, allied to *semitessellalis*. In the absence of a male, I do not propose a name for this New Guinea specimen. The majority of specimens examined were similar in pattern to the holotype. This species has a smaller signum than *C. ignotalis*, most of the other species in the genus lack a signum.

DISTRIBUTION. Australia; [New Guinea?].

#### MATERIAL EXAMINED

Holotype ♂. AUSTRALIA: Moreton Bay, B.M. slide no. 8309, in BMNH.

AUSTRALIA: 2 ♂, Mt Tamborine, Queensland, 1500 ft, 15.xi.1942 (*Tindale*), in South Australian Museum; 3 ♂, 1 ♀, Mt Tamborine, 4.xi.1961 (*Common & Upton*), in C.S.I.R.O., Canberra; 1 ♂, Queensland, Lamington National Park, 2700 ft, 7.xi.1961 (*Common & Upton*), in C.S.I.R.O., Canberra; 1 ♀, Queensland, Brisbane, in C.S.I.R.O., Canberra; 1 ♂, New South Wales, Upper Allyn River, 1000 ft, 8.xi.1960 (*Common & Upton*), in C.S.I.R.O., Canberra; [NEW GUINEA: 1 ♀, Fly River, Kiungu, 2.vii–31.x.1957 (*Brandt*), in C.S.I.R.O., Canberra].

#### *Canaea plagiata* (Warren) **comb. n.**

*Letchena plagiata* Warren, 1897: 382.

[*Rhodoneura semitessellata* sensu Warren, 1898: 223, nec Walker, 1897, misidentification.]

[*Rhodoneura semitessellata* sensu Dalle Torre, 1914: 33, nec Walker, misidentification.]

[*Rhodoneura semitessellata* sensu Gaede, 1932: 755, nec Walker, misidentification.]

This species is separated into four subspecies, partly on pattern and partly on differences in the shape of the uncus and juxta in the male genitalia. The minutely ciliate antennae and larger size together with the strongly clavate uncus, very enlarged sacculus and terminal spine on the aedeagus separate this species from the others in the genus. The females usually have strongly sclerotized processes on either side of the ostium.

#### *Canaea plagiata plagiata* (Warren)

(Pl. 4, fig. 24; Pl. 11, figs 62, 65)

*Letchena plagiata* Warren, 1897: 382.

♀. Wing, 18.5–21 mm. Vertex pale brown. Antennae minutely ciliate. Labial palps with third segment  $\frac{1}{2}$  length of second. Tegulae and thorax pale brown. Frenulum triple.

Hind tibia with outer spur of distal pair less than  $\frac{1}{2}$  length of inner spur. Fore wing, pattern as in Pl. 4, fig. 24, orange-brown with brown pattern and translucent areas. Veins  $R_1$ ,  $R_2$ ,  $R_3$ , and  $R_4$  run close together but do not join. Hind wing, colour and pattern as fore wing.

GENITALIA ♀ (Pl. 11, figs 62, 65). Anal papillae short. Ostium heavily sclerotized with two prominent, leaf-like, lateral processes. Ostium and processes strongly spinose. Duct of bursa convolute. No signum. Secondary sac arising from opening of bursa to duct.

♂. Unknown.

DISCUSSION. This subspecies can be separated from the others by the reduction of the grey-brown patterning in the subterminal area of the fore wing. The rest of the colour is more orange-brown than in the other subspecies. The lateral processes on the ostium are more strongly toothed in *C. p. plagiata* than in the other subspecies.

DISTRIBUTION. Trobriand Islands.

#### MATERIAL EXAMINED

LECTOTYPE ♀, here designated. TROBRIAND Is: Kiriwini, 1895 (*Meek*), B.M. slide no. 10820, in BMNH.

Paralectotypes. TROBRIAND Is: 4 ♀, data as type.

### *Canaea plagiata albicollaris* (Warren) stat. n., comb. n.

(Pl. 4, fig. 21; Pl. 8, fig. 46)

*Letchena albicollaris* Warren, 1907: 104.

*Rhodoneura albicollaris* (Warren) Dalle Torre, 1914: 18.

[*Rhodoneura sordidula* sensu Gaede, 1932: 757, nec Pagenstecher, 1892, misidentification.]

♂. Wing, 17.5–18.5 mm. Vertex white anteriad, brown posteriad. Antennae minutely ciliate. Labial palps with third segment  $\frac{1}{2}$  length of second, upturned, just reaching vertex. Patagia white. Thorax and tegulae reddish brown. Hind tibia with scale tufts and outer spur of distal pair less than  $\frac{1}{2}$  length of inner spur. Fore wing, pattern as in Pl. 4, fig. 21, grey-brown with lighter areas and reddish brown edges to circular areas. Basal area grey with black spots. Underside, similar, paler. Veins  $R_1$ ,  $R_2$ , and  $R_3$  arise close together from cell but do not anastomose. Hind wing, pattern and colour as fore wing.

GENITALIA ♂ (Pl. 8, fig. 46). Uncus strongly clavate. Gnathum and socii joined round anal tube. Valve slenders in apical half. Saccus very enlarged, basal process on each side of membranous juxta short, pointed with broad base. Base of costa of valve with prominent sclerotized process. Aedeagus with small sclerotized plate and row of small spines. Apex of aedeagus with strong, sclerotized, thorn-like spine.

♀. Wing, 19–21 mm. Pattern as male but more orange-brown. Labial palps with third segment  $\frac{1}{2}$  length of second. Venation as male but vein  $R_3$  and  $R_4$  closer together than in male.

GENITALIA ♀. Similar to nominate subspecies but lateral process on each side of ostium smaller and with less serrate edges.

DISCUSSION. This subspecies cannot be separated from *p. neoalbicollaris* externally in the male but in the genitalia the sclerotized process on the base of the costa of the valves is broader in *p. neoalbicollaris* than in *p. albicollaris*, and the process on the saccus is more angled in *neoalbicollaris*. The females are very distinct on pattern and *neoalbicollaris* is generally more red-brown than *albicollaris*. In the genitalia the duct of the bursa of *neoalbicollaris* is more sclerotized than *albicollaris* and less convolute. This latter also distinguishes it from the nominate subspecies. The relationship of *albicollaris* and *neoalbicollaris* is not clear. The

females are very distinct but the males are less so, the reverse condition of the other species of the genus. The males of *neoalbicollaris* are associated with the females on locality (see under *neoalbicollaris*).

DISTRIBUTION. New Guinea.

#### MATERIAL EXAMINED

LECTOTYPE ♂, here designated. NEW GUINEA: Biagi, Mambare R., 5000 ft, iv.1906 (*Meek*), B.M. slide no. 10818, in BMNH.

Paralectotypes. 2 ♂, data as type.

Other material. NEW GUINEA: 1 ♂, Biagi, Mambare R., 5000 ft, iv.1906 (*Meek*) (not mentioned in original description); 1 ♀, Kumusi R., low elev. (*Meek*); 2 ♀, Gulf of Papua, Omati, 26-27.iii.1952 (*Barnett*).

#### *Canaea plagiata neoalbicollaris* subsp. n.

(Pl. 4, figs 22, 23; Pl. 8, fig. 47; Pl. 11, figs 63, 64)

♀. Wing, 18-18.5 mm. Labial palps long, protruding well in front of head, third segment equal in length to second segment, otherwise as in nominate subspecies. Fore wing, pattern as in Pl. 4, fig. 23, reddish brown with small rounded areas. Basal area with patches of red. Thorax red-brown, tegulae brown. Underside, pattern as upperside but red colour not as prominent. Veins  $R_1$ ,  $R_2$  and  $R_3$  approach closely but do not join. Hind wing, colour and pattern as fore wing.

GENITALIA ♀ (Pl. 11, figs 63, 64). Anal papillae short, ostium sclerotized. Short sclerotized part of duct with lateral diverticulum. Duct narrows, then broader, sclerotized and regularly spinose part with few convolutions. Bursa with two small patches of spines, secondary sac present.

♂. Wing, 16.5-19 mm. Similar to *p. albicollaris*. Fore wing, pattern as in Pl. 4, fig. 22.

GENITALIA ♂ (Pl. 8, fig. 47). As *p. albicollaris* but differing in shape of sclerotized process at base of costa and in more angled sacculus processes on each side of juxta.

DISCUSSION. The female is very distinct from *albicollaris* and could even represent a new species. The males associated with it were all collected in the same locality and at the same time but it is possible that these males should be associated with *albicollaris*; there are however, small differences in the genitalia. In a short series, it is not clear how much of this is due to intra-specific variation or how much is specific differences. The only other female is from the Amazon Bay area in New Guinea. This specimen matches the type in pattern and has the sclerotized duct to the bursa but it has small lateral sclerotized processes on the ostium which are completely lacking in the holotype.

DISTRIBUTION: New Guinea; Papua.

#### MATERIAL EXAMINED

Holotype ♀. PAPUA: Hydrographers Mts, 2500 ft, ii.1918 (*Eichorn Bros.*), B.M. slide no. 10815, in BMNH.

Material not included in the type-series. NEW GUINEA: 1 ♀, Amazon Bay, Dogon, 2300 ft, 13.ix-11.xii.1962 (*Brandt*), in C.S.I.R.O., Canberra; 4 ♂, Amazon Bay, Doveta, 2400 ft, 24.vii-11.ix.1963 (*Brandt*), in C.S.I.R.O., Canberra; PAPUA: 2 ♂, data as type; 1 ♂, Hydrographers Mts, 2500 ft, iv.1918 (*Eichorn Bros.*).

*Canaea plagiata propinquita* subsp. n.

(Pl. 5, figs 25, 26; Pl. 8, fig. 48; Pl. 11, figs 66, 67)

♂. Wing, 16–18 mm. Similar to *C. plagiata albicollaris*. Fore wing, pattern as in Pl. 5, fig. 25, orange-brown with brown basal areas. Venation as nominate subspecies.

GENITALIA ♂ (Pl. 8, fig. 48). Uncus strongly clavate, less rounded than nominate subspecies. Gnathus with two small spines near mid-line and small sclerotized median projection. Sacculus process on either side of membranous juxta very small. Sclerotized process near base of costal margin of valve broad, with more processes than nominate subspecies. Aedeagus with small sclerotized plate and row of teeth. Curved sclerotized process at apex of aedeagus.

♀. Wing, 18–18.5 mm. (Pl. 5, fig. 26). Pattern as male but darker coloured, more orange-brown or red-brown. Labial palps long, third segment equal in length to second segment. Frenulum triple.

GENITALIA ♀ (Pl. 11, figs 66, 67). Anal papillae short. Lateral processes on ostium spiny and serrate. Duct strongly convolute. Bursa with minute spines and secondary sac.

DISCUSSION. From the other subspecies, the male can be separated by the narrow brown patch in the hind margin of the median area of the fore wing and the much reduced sacculus processes on either side of the juxta. The spine at the apex of the aedeagus is at a more obtuse angle than in the other subspecies. The females are generally darker than the nominate subspecies and have a smaller lateral process to the ostium. From *plagiata neoalbicollaris* the females can be separated by the lack of the sclerotized ductus and from the females of *plagiata albicollaris* by the greater distance between the two lateral lobes of the ostium in *plagiata propinquita*. This subspecies seems to replace *plagiata albicollaris* in West Irian.

DISTRIBUTION. Indonesia: West Irian.

## MATERIAL EXAMINED

Holotype ♂. INDONESIA: West Irian, Nr Oetakwa R., Snow Mts, up to 3500 ft, x-xii.1910 (Meek), B.M. slide no. 10806, in BMNH.

Paratypes. INDONESIA: 7 ♂, data as holotype; 6 ♂, Upper Setakawa, Snow Mts, 2–3000 ft, viii-ix.1910 (Meek); 3 ♂, Mt Goliath, 5000 ft, 13° long., ii.1911 (Meek); 1 ♂, 1 ♀, Wandammen Mts, xi.1914, 3–4000 ft (Pratt); 2 ♂, Fak-Fak, xii.1907 (Pratt), 1700 ft; 1 ♀, Waigeu, Camp Nok, 2500 ft, iv.1938 (Cheesman); 2 ♂, Ninay Valley, Centr. Arfak Mts, 3500 ft, ii-iii.1909.

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